

MF51E Medical Application Varnished Wire Enamelled Wire NTC Thermistors

1. General



✧ Description

MF51E Medical Application Varnished Wire Enamelled Wire NTC Thermistors were specially designed for use in electronic thermometers which require better than average accuracy. The extremely small size allows the thermistor to respond very quickly to tiny changes in temperature. The MF51E can be supplied un-calibrated with standard tolerances or calibrated and grouped according to R at $37^{\circ}\text{C} \pm 0.01\%$ for extreme interchangeability so as to eliminate the need for other calibrations.

✧ Type designation (example)

| | | | | |
|-------|-----|---|------|---|
| MF51E | 103 | F | 3950 | F |
| ① | ② | ③ | ④ | ⑤ |

① Type : Peel-Shaped Precision temperature measurement NTC Thermistor

② Nominal resistance : 103 is 10K Ohm

③ Allowable Resistance tolerance code: E $\pm 0.5\%$, F $\pm 1\%$, G $\pm 2\%$, H $\pm 3\%$, J $\pm 5\%$

④ Beta value : 3950K

⑤ Beta value tolerance code: E $\pm 0.5\%$, F $\pm 1\%$,

✧ Application

- Electronic Thermometers
- Medical Equipment and Patient Monitoring

✧ Characteristics

- Small Size and fast response and light weight
- Available tolerances: $\pm 0.5\%$, $\pm 1\%$, $\pm 2\%$, $\pm 3\%$ and $\pm 5\%$
- B Value tolerances: $\pm 0.5\%$, $\pm 1.0\%$ and $\pm 2.0\%$
- Resistance calibration available at $37^{\circ}\text{C} \pm 0.01\%$ (see table for details of grouping)
- Long-term Stability and Reliability
- Excellent Tolerance and Interchangeability
- Available in all popular resistance values
- Dissipation Constant $\geq 0.7\text{mW}/^{\circ}\text{C}$
- Time Constant of ≤ 3.2 seconds
- Rated Power: 3.5mW
- Operating Temperature Range -40°C to 100°C

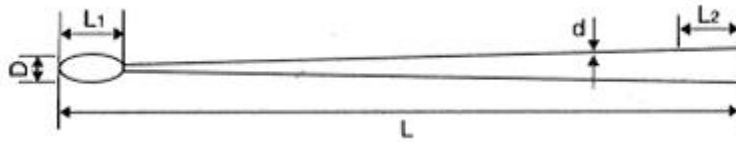
✧ Specifications

MF51E Medical Application Varnished Wire Enamelled Wire NTC Thermistors

| Part No. | Nominal resistance R 25°C | | B Value (R25/50°C) | | Rate d pow er (mw) | Dissipati on (mW/°C) | Therm al time consta nt (S) | Operating temp. (°C) |
|------------|------------------------------|----------------------|-----------------------------|----------------------|--------------------------------|----------------------------|---|----------------------------|
| | Range (KΩ) | Tolera nce (%) | Nomin al value (K) | Toleran ce (%) | | | | |
| MF51E 3270 | | | | | | | | |
| MF51E 3380 | | | | | | | | |
| MF51E 3470 | 0.2-20 | | 3270 | | | | | |
| MF51E 3600 | 0.5-50 | | 3380 | | | | | |
| MF51E 3950 | 0.5-50 | | 3470 | | | | | |
| MF51E 4000 | 1-100 | E+/-0.5 | 3600 | | | | | |
| MF51E 4050 | 5-100 | F+/-1 | 3950 | E+/-0.5 | 3.5 | ≥ 0.7 | ≤ 3.2 | -40°C - +100°C |
| MF51E 4300 | 5-100 | G+/-2 | 4000 | F+/-1 | | | | |
| MF51E 4500 | 5-200 | H+/-3 | 4050 | G+/-2 | | | | |
| MF51E 4300 | 10-250 | J+/-5 | 4150 | | | | | |
| MF51E 4500 | 20-1000 | | 4300 | | | | | |
| MF51E 4500 | 20-1000 | | 4500 | | | | | |
| MF51E 4300 | | | | | | | | |
| MF51E 4500 | | | | | | | | |
| MF51E 4300 | | | | | | | | |
| MF51E 4500 | | | | | | | | |

➤ **Dimension(Unit:mm)**

MF51E Medical Application Varnished Wire Enamelled Wire NTC Thermistors



| Dimension | D max | L 1 max | L 1 +/- 3 | L 2 +/- 1 | d +/- 0.05 |
|-------------|-------|--------------------|--------------|--------------|---------------|
| Normal size | 1.6 | 4.0 | 100 | 3 | 0.2 |
| | 1.6 | Customer Specified | | | |

➤ Resistance Calibration at 37°C +/- 0.005°C of MF51E303E3950

R37°C=30.025KΩ±2.664% B30/45=3950K±0.5%

| Category | (KΩ) | Category | (KΩ) | Category | (KΩ) | Category | (KΩ) |
|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| 1 | 29.275KΩ | 9 | 29.675 KΩ | 17 | 30.075 KΩ | 25 | 30.475 KΩ |
| 2 | 29.325 KΩ | 10 | 29.725 KΩ | 18 | 30.125 KΩ | 26 | 30.525 KΩ |
| 3 | 29.375 KΩ | 11 | 29.775 KΩ | 19 | 30.175 KΩ | 27 | 30.575 KΩ |
| 4 | 29.425 KΩ | 12 | 29.825 KΩ | 20 | 30.225 KΩ | 28 | 30.625 KΩ |
| 5 | 29.475 KΩ | 13 | 29.875 KΩ | 21 | 30.275 KΩ | 29 | 30.675 KΩ |
| 6 | 29.525 KΩ | 14 | 29.925 KΩ | 22 | 30.325 KΩ | 30 | 30.725 KΩ |
| 7 | 29.575 KΩ | 15 | 29.975 KΩ | 23 | 30.375 KΩ | 31 | 30.775 KΩ |
| 8 | 29.625 KΩ | 16 | 30.025 KΩ | 24 | 30.425 KΩ | 32 | 30.825 KΩ |

✧ Mechanical Requirements

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MF51E Medical Application Varnished Wire Enamelled Wire NTC Thermistors

| Item | Requirements | Test Method |
|--------------------------------|---|---|
| 1.Solder-ability | The terminals shall be uniformly tinned, and its area \geq 95% | Dipping the NTC terminals to a depth of 15mm in a soldering bath of $245\pm 5^{\circ}\text{C}$ and to the place of 6mm far from NTC body for $3\pm 0.5\text{s}$ (See IEC68-2-20 /GB2423.28 Ta) |
| 2.Resistance To Soldering Heat | No visible mechanical damage. $\Delta R/RN \leq 20\%$ ($\Delta R = RN-RN' $) | Dipping the NTC terminals to a depth of 15mm in a soldering bath of $260\pm 5^{\circ}\text{C}$ and to the place for 6mm below from NTC body for $3\pm 0.5\text{s}$. After recovering 4-5h under $25\pm 2^{\circ}\text{C}$. The rated zero power resistance value RN' shall be measured. (See IEC68-2-20 /GB2423.28 Tb) |
| 3.Strength of lead terminal | No break out $\Delta R/RN \leq 20\%$ ($\Delta R = RN-RN' $) | Fasten the body and apply a force gradually to each lead until 10N and then keep for 10sec, Hold body and apply a force to each lead until 90° slowly at 5N in the direction of lead axis and then keep for 10sec, and do this in the opposite direction repeat for other terminal. After recovering 4~5h under $25\pm 2^{\circ}\text{C}$, the rated zero power resistance value RN' shall be measured. (See IEC68-2-21/GB2423.29 Ua / Ub) |

◇ Reliability Test

| Item | Requirements | Test Method |
|------|--------------|-------------|
|------|--------------|-------------|

MF51E Medical Application Varnished Wire Enamelled Wire NTC Thermistors

| | | | |
|----------------------------------|---------|--|--|
| 1.Temp. Testing | Cycling | No visible mechanical damage. $\Delta RN / RN \leq 20\%$ ($\Delta R = RN - RN' $) | Ta: $-40 \pm 3^{\circ}\text{C} / 30\text{min} \rightarrow 25 \pm 2^{\circ}\text{C} / 5\text{min} \rightarrow$ Tb: $160 \pm 3^{\circ}\text{C} / 30\text{min} \rightarrow 25 \pm 2^{\circ}\text{C} / 5\text{min}$ Cycles: 5times After recovering 4~5 h under $25 \pm 2^{\circ}\text{C}$, the rated zero power resistance value RN' shall be measured. |
| 2.Electrical Testing | Cycling | | Ambient temp. Range: $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Cycles: 2,000times On / Off: 5 s / 55 s Test Current: 7A After recovering 4~5h under $25 \pm 2^{\circ}\text{C}$, the rated zero power resistance value RN' shall be measured. |
| 3.LoadLife (Endurance) Testing | | | Ambient temp. Range: $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$; 7A/ 1,000 \pm 24h After recovering 4~5 h under $25 \pm 2^{\circ}\text{C}$, the rated zero power resistance value RN' shall be measured. |
| 4. Humidity Testing | | No visible mechanical damage. $\Delta RN / RN \leq 20\%$ ($\Delta R = RN - RN' $) | Ambient temp. range : $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ R.H.: $93 \pm 3\%$, Energized time: 1000 \pm 24 h After recovering 4~5 h under $25 \pm 2^{\circ}\text{C}$, the rated zero power resistance value RN' shall be measured. |

✧ **Package**

➤ **Bulk Packaging:**

| Packing | Packing method |
|---------|----------------|
| Bulk | 500pcs/polybag |

✧ **STORAGE CONDITIONS:**

- Temperature: $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- Humidity: $\leq 70\% \text{RH}$
- Term: ≤ 6 months (First-in/ First-out)

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➤ Place:

Do not exposing the components to the following conditions, otherwise, it may result in deterioration of characteristics.

- 1) Corrosive gas or deoxidizing gas.
- 2) Flammable and explosive gases.
- 3) Oil, water and chemical liquid.
- 4) Under the sunlight.

- Handling after seal open: After unpacking of the minimum package, reseal it promptly or store it inside a sealed container with a drying agent.

❖ **WARNING** 

Do not apply the components under the following conditions, otherwise, it may result in deterioration of characteristics, destruction of components or in the worst case, to catching fire.

- Exceeding I_{max}.
- Exceeding rated temperature range.
- Inferior thermal dissipation (Due to badly inferior thermal dissipation, some part of the components body will become overheated and then be damaged.)